

CLAIMS

1. Inactivated microorganisms containing one or more of the substances having a pharmacological activity wherein said substances are chosen in the group consisting of: antibiotics, anti-inflammatory, antibacterial, antiviral, antifungal and 5 antiparasitic agents, vaccines, and nutritional substances, provided that said pharmacologically active substances are neither minerals nor enzymes.
2. Inactivated microorganisms according to Claim 1 wherein said antibiotic is oxytetracycline.
3. Inactivated microorganisms according to Claim 1 wherein said antibacterial is 10 sulfadimethoxine.
4. Inactivated microorganisms according to Claim 1 wherein said nutritional substances are chosen in the group consisting of: vitamins, food integrators, active principles of vegetable origin and nutriceuticals.
5. Inactivated microorganisms according to Claim 4 wherein said vitamins are 15 chosen in the group consisting of: ascorbic acid, cyanocobalamin (vitamin B12), folic acid, thiamine (Vitamin B1), α -tocopherol.
6. Inactivated microorganisms according to Claim 4 wherein said nutriceuticals are bioflavonoids.
7. Inactivated microorganisms according to Claim 6 wherein said bioflavonoids 20 are chosen among: sodium quercetin, catechin, isocatechin, aliphatic polyalcohols, polyphenols, flavans, cyanins, resveratrol, hyperic acid and rutinoids.
8. Inactivated microorganisms according to Claims 1-7, wherein said microorganism is Saccharomyces cerevisiae.
9. Food compositions characterized in that the inactivated microorganisms 25 according to Claims 1-8 are used.
10. Food compositions according to Claim 9 suitable for human and animal use.
11. Food compositions according to Claim 10 wherein said animal are fishes
12. Food compositions according to Claim 11 wherein said fish are in the early stages of growth.
- 30 13. Use of one or more inactivated microorganisms according to Claims 1-12, in human or animal alimentation.
14. Use of the microorganisms according to Claims 1-12, as components of

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feeding or premixes in zootechnics.

15. Use of the microorganisms according to Claims 10-12 for the feeding of fish.

16. Process for the preparation of inactivated microorganisms containing one or more soluble and/or solubilizable substances having pharmacological activity and/or nutritional substances having pharmacological activity, according to Claims 1-12, comprising the following steps:

i) drawing out the endocellular mass of a suitable microorganism by means of hypertonic treatment, separation of the drawn out endocellular mass and recovery of the empty microorganisms;

ii) optional inactivation of the microorganism obtained in Step i) chemically or physically, leaving the external membrane of the microorganism unaltered; and

iii) intracellular loading of one or more soluble and/or solubilizable substances having pharmacological activity and/or nutritional substances having pharmacological activity, into the inactivated microorganism obtained in Step i) or Step ii), is obtained by means of hypo- and/or iso-tonic treatment.

17. Process for the preparation of inactivated microorganisms according to Claim 16, characterized in that:

in Step i) the drawing out of the endocellular mass is obtained by incubation in a hypertonic solution of the same pharmacologically active substance to be loaded into the microorganism;

in Step iii) said pharmacologically active substance is already present in the solution and is loaded into the microorganism with a change of the osmolarity due to dilution of the solution to hypo- and/or isotonicity.

18. Process according to Claims 16 and 17, characterized in that Step iii) is followed by treatment of the microorganisms with a fixative or a disinfectant agent

19. Process for the preparation of inactivated microorganisms described in Claims 1-12, according to the following steps:

1) the microorganism is inactivated by thermal treatment, at 60-65°C for 30-120 min;

2) the inactivated cells of the microorganism are resuspended in an isotonic medium comprising the active principle to be incorporated;

3) the suspension is left under stirring for 48-72 hours;

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4) the suspension is centrifuged;

5) optional buffering and/or fixation is carried out using formalin and/or glutaraldehyde.

20. Process according to Claims 16 and 17, characterized in that the hypertonic treatment in step ii) is obtained by incubation of a hypertonic solution comprising:

- NaCl in concentrations higher than 0.2 M;
- optionally sodium citrate 0.03 - 0.1 M.

21. Process according to Claims 16 and 17, in which said hypotonic treatment in step iii) is obtained by means of a hypotonic solution comprising:

- NaCl in concentrations lower than 0.12 M;
- optionally sodium citrate in concentrations lower than 0.025 M.

22. Process according to Claim 16, in which the isotonic treatment in step iii) is performed by a 0.9% NaCl isotonic solution, optionally comprising sodium citrate 0.025 M.

15 23. Process according to Claim 16, in which

- said hypertonic solution is NaCl 1.0 M and sodium citrate 0.05 M;
- said hypotonic solution is NaCl 0.05 M and sodium citrate 0.005 M

24. Process according to Claim 16, in which

- said hypertonic solution is NaCl 1.0 M and sodium citrate 0.05 M;
- said isotonic solution is NaCl 0.9% and sodium citrate 0.025 M.

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